THE DATA MUST FLOW

By

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NETWORK STRUCTURES

Switching Network
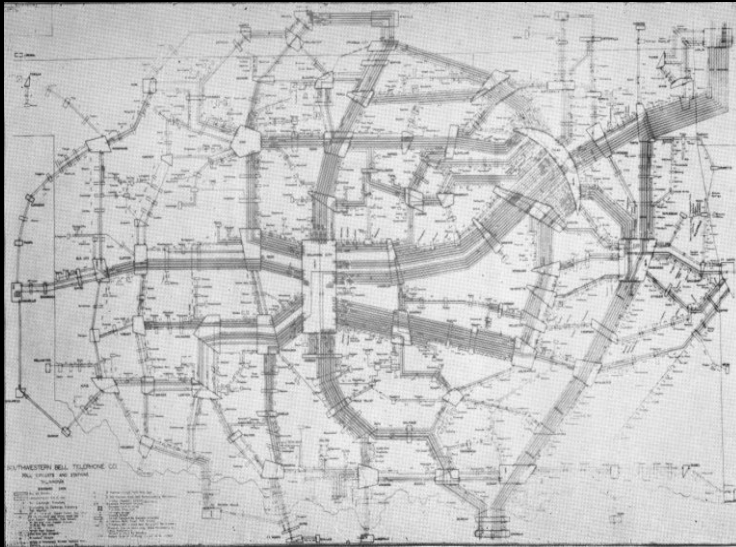
MANET
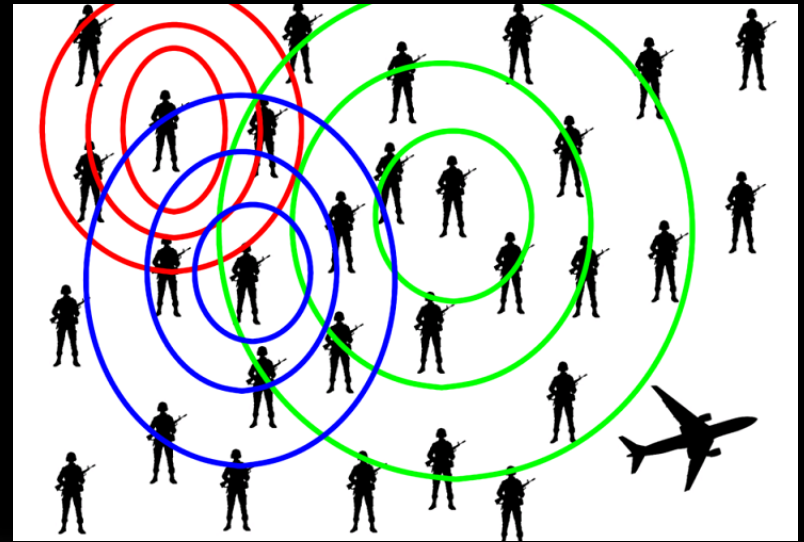
NETWORK MATRIX

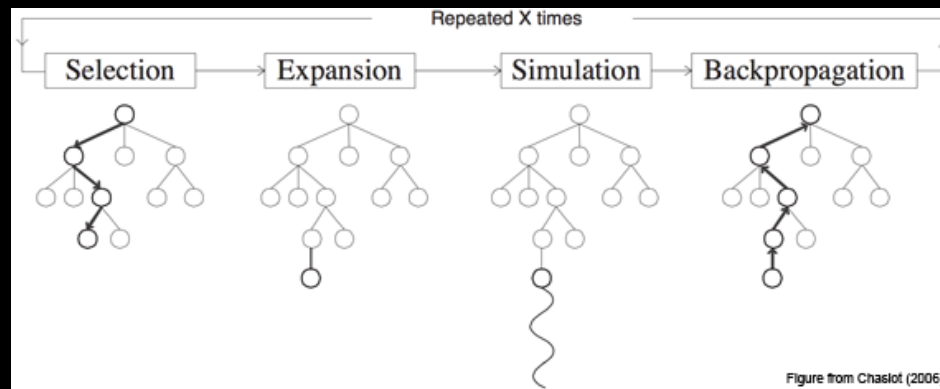| Context	Switching	MANET	Social Network
Problem	Information distribution	Information distribution	Information distribution
Structure	Largely static and linear topography	Highly dynamic and complex topography	Highly dynamic and complex topography
Graph type	Sparse	Dense	
Solution	Directed end-to-end communication	???	Distributed information dissemination
Mechanism	Switching	???	I know the information my friends desire

NETWORK ATOMICS

| Type	Switching	TDMF
Agent/packet	• Packets are dumb. • Do not make decisions. • Are passive in their routing and not aware of network.	• Agents are smart. • Agents make decisions. • Aware of the local topology. • Aware of their search tags and relations between tags via ontologies.
Node	• Heterogeneous services • Can be router, switch, client server. • Different nodes offer different services.	• Homogeneous services. • All nodes offer the same services but different information; no server-client. • Aware of local topology via local map and neighbor interest lists. • Hold information for dissemination.

ATOMICS BEHAVIOR

Type	Switching	TDMF
Agent/packet	• Routed through network by switches using MAC address.	• Agents are used for route discovery and information searching. • Are created and dispatched by nodes • Decide their own path at each node.
Node	• Will behave differently depending on the services offered.	• Hold information for dissemination. • Hold maps of the local topography. • Actively and intelligently push information to their neighbors who are interested in this information.

MONTE CARLO TREE SEARCH

Repeated X times

Selection → Expansion → Simulation → Backpropagation

Figure from Chaslot (2006)

- Selection: Use scores generated by previous searches to navigate to the edge of the map; not the edge of the network.

- Expansion: Decide on node to append to map.

- Simulation: Use a random selection or heuristics to find an end state.

- BackPropagation: Return to the root node. Report findings and update scores at each node along the route.

MONTE CARLO TREE SEARCH (TDMF)

Figure from Chaslot (2006)
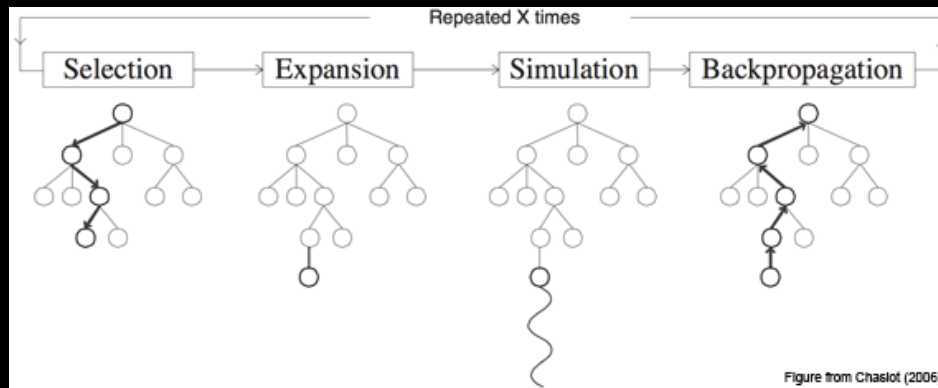
- Selection/Expansion: Nodes use local map stored at their originating node to navigate to edge of the map.

- Simulation: Here nodes use ontological relations to navigate the network searching for information. Here clustering will be performed on the available neighbor interest lists and the agents search tags.

- BackPropagation: Agents attempt to return to the root node to report the results of its search.

DATA STREAMS

- Thematically correlated routes that are established via the intelligent searching of the Agents.

- Nodes store local copies of information and pass copies to neighbors who are interested.

- Routes are informed by ontologies not a fixed infrastructure.

- Streams are emergent of the behavior of the agents. They are not formally defined.

- Will actively and dynamically change course as the topology of the network changes.
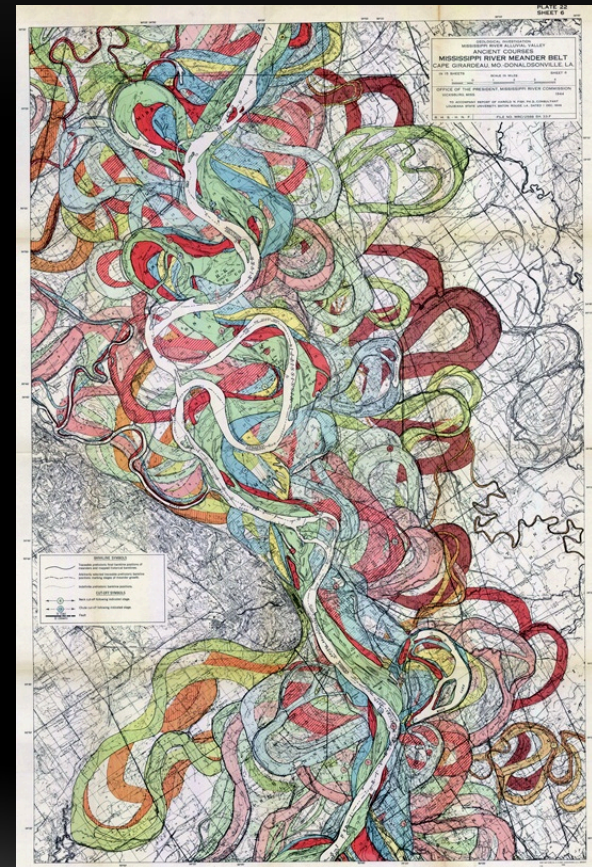
FUTURE RESEARCH

- Specify the mechanism by which clustering is performed by the agents to make their routing decisions.

  - i.e. WordNet, ConceptNet

- Use of Natural Language Processing (NLP) to parse information intelligently.

- Simulations:

  - i.e. ns3, OPNET

- Research of hardware options.